WHAT IS CLAIMED IS:

1. A collector for illumination systems for light having a wavelength ≤ 193 nm comprising:

a first mirror shell adjacent to, and positioned inside of, a second mirror shell around a common axis of rotation, wherein said first and second mirror shells are rotationally symmetric; and

a component in a region between said first and second mirror shells,

wherein said collector is for receiving said light from a light source via an object-side aperture and for illuminating an area in an image-side plane, and

wherein said region is not used by said light.

2. The collector of claim 1,

wherein said light includes a light bundle that is received and reflected in a direction of said image-side plane from each of said first and second mirror shells, and

wherein said light bundle defines said region.

3. The collector of claim 2,

wherein each of said first and second mirror shells comprises a first mirror segment having a first optical surface is assigned a start point and an end point in a meridional plane that includes said axis of rotation,

wherein said start point defines an outer edge beam, and

wherein said end point defines an inner edge beam,

wherein said inner and outer edge beams, when rotated around said axis of rotation, limit said light bundle,

wherein said light bundle is reflected by said first optical surface of each of said first and second mirror shells and runs through

said collector from said object-side aperture to said image-side plane.

4. The collector of claim 2, wherein each of said first and second mirror shells is assigned to a ring aperture element of said object-side aperture.

5. The collector of claim 1, wherein said component is selected from the group consisting of a detection means, a decoupling mirror, and elements without an optical effect, a shielding device, a cooling device, and an attachment device.

6. The collector of claim 1,

wherein said area includes a first ring element assigned to a first ring aperture element and a second ring element assigned to a second ring aperture element, and

wherein said first and second mirror shells each have a size in a direction of said axis of rotation, surface parameters, and a position such that irradiances of said first and second ring elements are about equal to one another.

7. The collector of claim 6, wherein said first and second ring elements adjoin one another continuously.

8. The collector of claim 1,

wherein said area includes a first ring element assigned to a first ring aperture element and a second ring element assigned to a second ring aperture element,

wherein said first and second ring aperture elements do not adjoin one another continuously, and

wherein said collector further comprises a gap between said first and second ring aperture elements.

9. The collector of claim 8, wherein said component is positioned in said gap.

10. The collector of claim 1, wherein said first and second mirror shells are annular segments of aspheres.

11. The collector of claim 10, wherein said first and second mirror shells are annular segments of a form selected from the group consisting of an ellipsoid, a paraboloid, and a hyperboloid.

12. The collector of claim 1, wherein at least one of said first and second mirror shells includes a first segment having a first optical surface and a second segment having a second optical surface.

13. The collector of claim 12,

wherein said first optical surface and said second optical surface do not adjoin one another continuously, and

wherein said collector further comprises a gap between said first optical surface and said second optical surface.

14. The collector of claim 13, wherein said component is positioned in said gap.

15. The collector of claim 12,

wherein said first segment is annular and a section of a hyperboloid, and

wherein said second segment is annular and a section of an ellipsoid.

16. The collector of claim 12,

wherein said first segment is annular and a section of a hyperboloid, and

wherein said second segment is annular and a section of a paraboloid.

17. The collector of claim 1, wherein said component comprises a cooling device having a channel through which a coolant flows.

18. The collector of claim 1, further comprising a support device for supporting at least one of said first mirror shell or said second mirror shell.

19. The collector of claim 18, wherein said support device has a support spoke that extends in a radial direction of said first and second mirror shells.

20. The collector of claim 18,

wherein said component comprises a coolant supply device and a coolant removal device, and

wherein said coolant supply device and said coolant removal device are positioned in a region of said support device.

21. The collector of claim 1, wherein said light is incident on said first and second mirror shells at angles of incidence $< 20°$ to surface tangents of said first and second mirror shells.

22. An illumination system for wavelengths ≤ 193 nm, comprising:

a light source;

a plane to be illuminated; and

a collector having:

a first mirror shell adjacent to, and positioned inside of, a second mirror shell around a common axis of rotation, wherein said first and second mirror shells are rotationally symmetric; and

a component in a region between said first and second mirror shells,

wherein said collector is for receiving said light from said light source via an object-side aperture and for illuminating an area in said plane, and

wherein said region is not used by said light.

23. The illumination system of claim 22, further comprising an optical element having a plurality of raster elements in a light path from said light source to said plane.

24. The illumination system of claim 23,

wherein said collector illuminates an annular region in said plane, and

wherein said plurality of raster elements are positioned in said plane substantially inside said annular region.

25. The illumination system of claim 23, further comprising an optical element having a function selected from the group consisting of imaging and field shaping.

26. The illumination system of claim 23, further comprising a plane conjugated to said light source, between said collector and said plane to be illuminated, in which an intermediate image of said light source is formed.

27. The illumination system of claim 26, further comprising a diaphragm positioned in or near said intermediate image, that separates said illumination system into a first space and a second space, wherein said first space includes said light source and said collector.

28. The illumination system of claim 27,

wherein said first space has a first internal pressure and said second space has a second internal pressure, and

wherein said first internal pressure and said second internal pressure are different from one another.

29. An EUV projection exposure facility comprising:

(a) an illumination system for wavelengths ≤ 193 nm for illuminating a mask, said illumination system including:

a light source;

a plane to be illuminated; and

a collector having:

a first mirror shell adjacent to, and positioned inside of, a second mirror shell around a common axis of rotation, wherein said first and second mirror shells are rotationally symmetric; and

a component in a region between said first and second mirror shells,

wherein said collector is for receiving said light from said light source via an object-side aperture and for illuminating an area in said plane, and

wherein said region is not used by said light; and

(b) a projection objective for imaging said mask on a light-sensitive object.

30. A method of manufacturing a microelectronic component, comprising using an EUV projection exposure facility having:

(a) an illumination system for wavelengths ≤ 193 nm for illuminating a mask, said illumination system including:

a light source;

a plane to be illuminated; and

a collector having:

a first mirror shell adjacent to, and positioned inside of, a second mirror shell around a common axis of rotation, wherein said first and second mirror shells are rotationally symmetric; and

a component in a region between said first and second mirror shells,

wherein said collector is for receiving said light from said light source via an object-side aperture and for illuminating an area in said plane, and

wherein said region is not used by said light; and

(b) a projection objective for imaging said mask on a light-sensitive object.